

Coincident-current Core Memories



PLANES & STACKS • COMPLETE SYSTEMS

from **FABRI-TEK**... *the leader in memory technology*

This catalog

presents the range of Fabri-Tek memory equipment. It is, we believe, a unique publication, for it encompasses the entire spectrum of core memory technology available to the computer industry today.

The dramatic growth of the data processing industry in the last decade has placed ever increasing demands for equipment which is not only faster, but also more versatile, more adaptable to the broadening requirements and applications for computers. Fabri-Tek has kept pace with these demands. In its relatively short existence, the company has become the recognized leader in core memory technology.

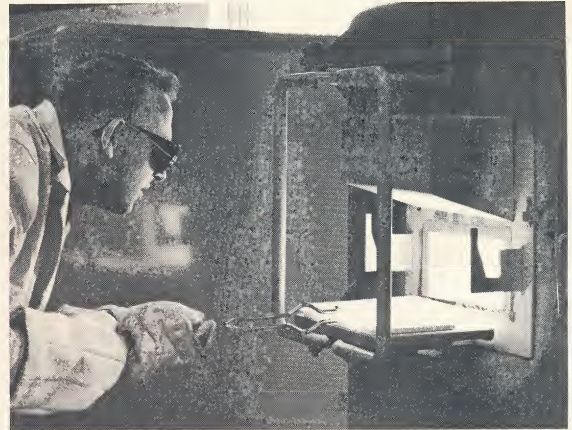
The products on the following pages reflect this leadership.

Fabri-Tek know-how

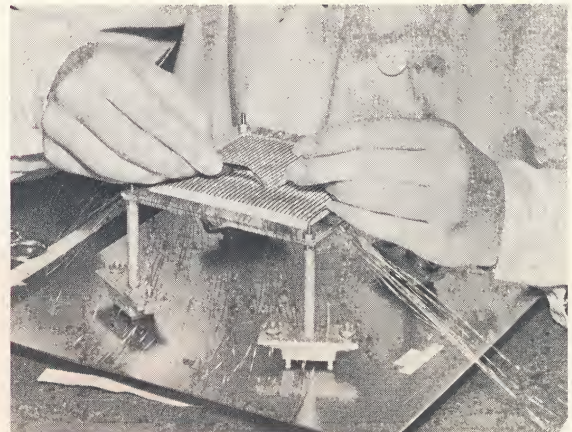
is based on an unusually diverse research, engineering and production organization. From Fabri-Tek has come a variety of new concepts, ranging from the industry's first production thin film memory to mass memory systems with capacities of more than 20 million bits. Innovations in core stringing, stack assembly and memory system design have laid the foundation for breakthroughs in design and fabrication.

Most important, Fabri-Tek has consistently concentrated on the needs of the user. The concept of "Standardized" design provides users with broad latitude in operating parameters without sacrificing overall system reliability. Each of the planes, stacks and systems outlined in this catalog has been designed to permit the user the widest component selection. And each one has been operationally proven for life, stability and economy.

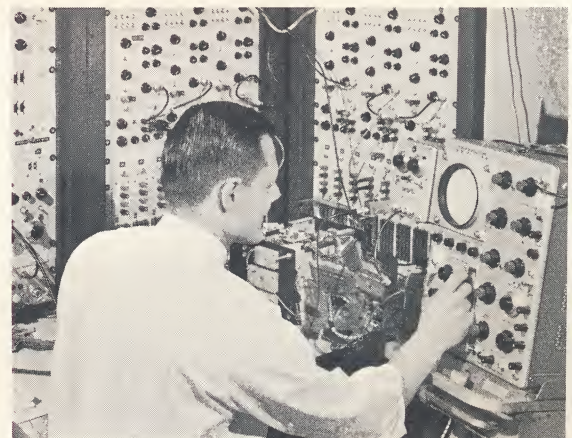
If the equipment shown here does not satisfy your particular system specifications, we would be happy to have our engineers meet with you to answer any technical or cost question.



Fabri-Tek now produces its own cores at Ft. Washington, Pa., facility. Here a technician prepares cores for sintering.



Core stringing requires skilled, sensitive hands. As many as five wires must be woven through each core.



100 percent inspection on all planes, stacks and systems employs sophisticated test equipment like this specially designed plane tester.

Fabri-Tek Memory Systems

Fabri-Tek offers designers the broadest range of memory systems available today. Whatever your requirements, whatever your application, there's a Fabri-Tek system available—at off-the-shelf reliability and economy. Operationally-proven systems are offered in speeds ranging from 300 nanoseconds to five microseconds. Word capacities range from 32 to 32,768 in any desired bit length.

Fabri-Tek systems are “user-oriented” from design concept through to production. Interface problems are essentially eliminated by thorough attention to physical, electrical and environmental requirements.

A variety of operational cycles are provided in Fabri-Tek systems. Split (read/modify/write) cycle operation, for instance, permits the user to retrieve data, modify it, and restore it all within the same cycle. In most cases, Fabri-Tek systems are packaged in standard, 19-inch RETMA racks.

All interconnect wiring is accomplished with solderless connections. Test points are located on each circuit module for easy maintenance.

Further user convenience is provided by Fabri-Tek's unique self-test circuitry, offered as standard equipment on most systems. Also included are address and data registers and power supply.

These techniques assure quick, relatively simple integration of the memory system into the user's equipment. They also provide minimum day-to-day maintenance and trouble-shooting.

Access modes

All Fabri-Tek memory systems (with the exception of two) are available in any of six access modes.

1. Random access. Information can be stored and retrieved from any portion of the memory by random addressing.

2. Sequential access. Information is stored and retrieved sequentially from any desired point within the memory.

3. Random and sequential access. A combination of 1 and 2, above.

4. Sequential interlace access. Similar to sequential (2), except that information can be loaded and partially unloaded at will through the use of a second address register.

5. Random-sequential interlace access. Can be addressed in either the random or sequential mode, or in any combination of the two. The load and unload operations can be intermixed.

6. General purpose access. In this mode all access methods can be employed, depending on user requirements. It is well-suited to storage applications which are selected by interface control signals. In addition to having all described access modes, it has full cycle/half cycle capabilities.

Other features

The standard Fabri-Tek systems are available with a variety of optional features. Ordinarily, the customer requires address register, data register, power supply and self-tester; however, the system can be supplied with any combination of these. The system can also be equipped with memory clear, parity check and generate, marginal voltage check, heated stack and manual load.

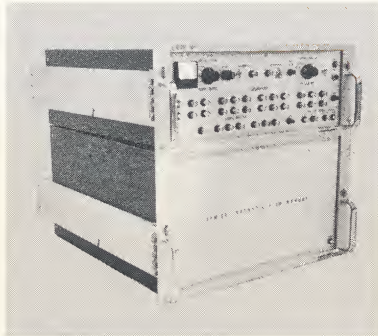
Data Saver

Fabri-Tek's data retention circuit “Data Saver” provides automatic protection of information in the event of power failure or line transients. In such cases, the cycle in progress will be completed before the memory shuts down. Valid and invalid interface signals will have no effect on the stored data.

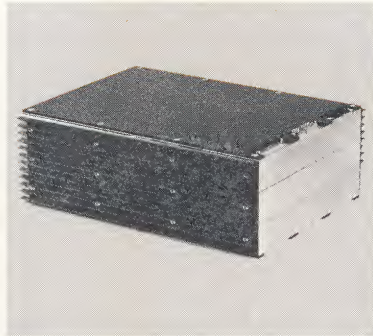
Environmental

Fabri-Tek's rugged design assures reliable operation over a broad range of temperature and humidity. Typical operating parameters include: Temperature 10C to 40C; humidity up to 90 percent without condensation; shock 15 G's standard commercial; vibration 10 G's standard commercial. With optional heated stack and “ruggedized” design, these limitations can be broadened to meet almost any application.

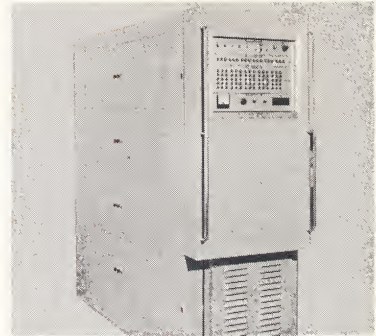
Fabri-Tek Memory Systems



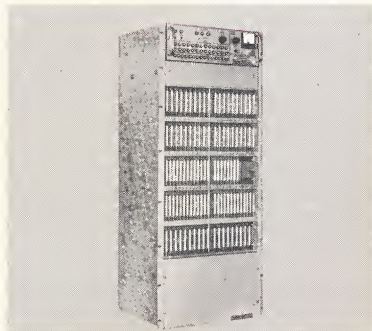
FFM-202, the industry's first production thin film system, offers ultra-fast storage with maximum versatility.



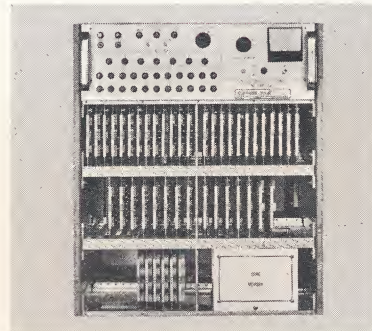
MC is a ruggedized system for medium speed applications in extreme environments.



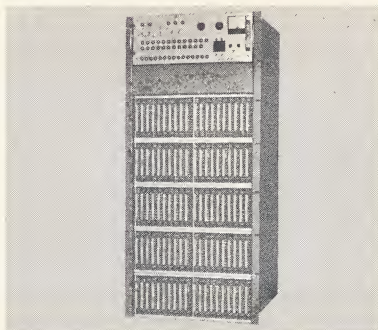
MT mass core memory system provides up to 20 million bits in random or sequential access.



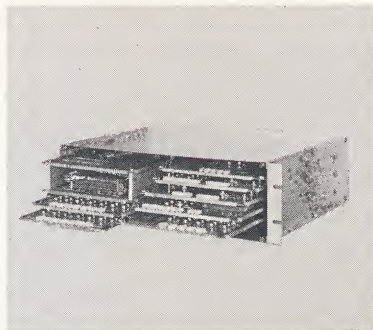
MAA2 utilizes "standardized" design concept, gives broad choice of components without sacrificing overall reliability.



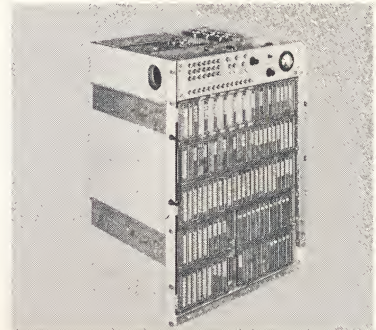
MBA5 provides solid state circuitry and broad operating margins for high reliability with unusual economy.



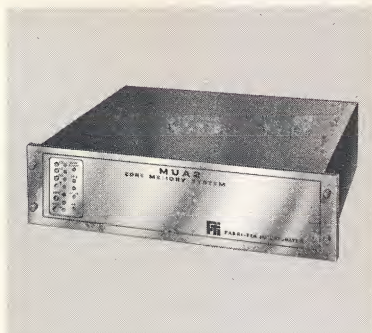
MFA1, a high speed, all-silicon system has large memory capacity and proven dependability.



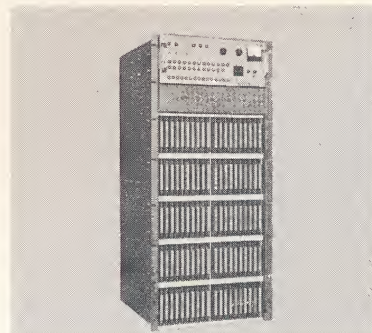
MLA5 employs integrated circuits for low cost, low power consumption and space-saving capabilities.



MRA2 uses die-cast aluminum card holders and lithium-ferrite cores to assure reliable operation over a wide range of ambients.



MUA2, with 2-usec full cycle time, offers maximum accuracy and durability at all temperatures.



MSA5, slower version of the MSA2, is all-silicon "standardized" with versatility and compatibility usually found only in prototype systems.

OPERATIONAL SUMMARY

System Class	Full Cycle Time	Half Cycle Time	Access Time	Capacity Words	Capacity Bit Length	Input Level	Output Level	Power Requirements	Operating Temperature
MAA2	2 usec	1.2 usec	850 nsec	32 to 32,768	No Limit	0 volts and -6 volts	0 volts and -6 volts	115V.ac $\pm 10\%$ Single Phase 50-60 CPS†	+10°C to +40°C
MBA5	5 usec	3 usec	2.5 usec	32 to 32,768	No Limit	0 volts and -6 volts	0 volts and -6 volts	115V.ac $\pm 10\%$ Single Phase 50-60 CPS†	+10°C to +40°C
MC	4 usec	2.5 usec	2 usec	32 to 32,768	No Limit	0 volts and +3 volts	0 volts and +3 volts	Per Customer Requirements	-55°C to +71°C
MFA1	1 usec	600 nsec	400 nsec	32 to 32,768	No Limit	0 volts and +6 volts	0 volts and +6 volts	115V.ac $\pm 10\%$ Single Phase 50-60 CPS†	+10°C to +40°C
MLA5	5 usec	Not Available	2.5 usec	64 to 2048	2 to 26	0 volts and +3.6 volts	0 volts and +3.0 volts	115V.ac $\pm 10\%$ Single Phase 50-60CPS	+15°C to +45°C
MRA2	2 usec	1.2 usec	850 nsec	32 to 32,768	No Limit	0 volts and +6 volts	0 volts and +6 volts	115V.ac $\pm 10\%$ Single Phase 50-60 CPS†	-40°C to +71°C
MSA2	2 usec	1.2 usec	850 nsec	32 to 32,768	No Limit	0 volts and +6 volts	0 volts and +6 volts	115V.ac $\pm 10\%$ Single Phase 50-60 CPS†	+10°C to +40°C
MSA5	5 usec	3 usec	2.5 usec	32 to 32,768	No Limit	0 volts and +6 volts	0 volts and +6 volts	115V.ac $\pm 10\%$ Single Phase 50-60 CPS†	+10°C to +40°C
MT	4 usec	Not Available	2.5 usec	No Limit	No Limit	0 volts and +6 volts	0 volts and +6 volts	115V.ac $\pm 10\%$ Single Phase 60CPS	+10°C to +40°C
MUA2	2 usec	1.2 usec	850 nanosec	64 to 4096	2 to 30	0 volts and +3.6 volts	0 volts and +3.6 volts	115V.ac $\pm 10\%$ Single Phase 50-60CPS	0°C to +50°C
FFM-202	300 nsec	200 nsec	150 nsec	32 to 512	1 to 36	0 volts and -4 volts	0 volts and -4 volts	115V.ac $\pm 10\%$ Single Phase 48-63CPS	0°C to +55°C

How to use this catalog

Study the system characteristics outlined for all Fabri-Tek systems. When you find the system which most closely meets your design requirements, refer to the detailed data sheet in the master catalog section indicated.

Relative Humidity Limit	Components	Storage Element	Wiring Scheme	*Access Mode							**Features													*** Dimensions (Inches)	SEE MASTER CATALOG SECTION		
				R	S	RS	SI	RSI	GP	AR	DR	DS	ST	MC	FS	PC	PG	MVC	DS	HS	ML	Optional "O"	Standard "S"				
90% without condensation	Germanium Discrete	30 Mil Core Std Ferrite	4 wire Coincident current	X	X	X	X	X	X	S	S	S	S	O	O	O	O	O	O	O	O	O	O	O	O	W-19 D-17 H-Based on Capacity	2
90% without condensation	Germanium Discrete	50 Mil Core Std Ferrite	4 wire Coincident current	X	X	X	X	X	X	S	S	S	S	O	O	O	O	O	O	O	O	O	O	O	O	W-19 D-17 H-Based on Capacity	3
Per Mil-E-5400 or Mil-E-16400	Silicon Discrete	30 Mil Core (Wide Temp.) Ferrite	4 wire Coincident current	X	X	X	X	X	X	S	S	O	O	O	O	O	O	O	S	-	O				W-7¼ D-9¾ H-Based on Capacity	4	
90% without condensation	Silicon Discrete	23 Mil Core Std Ferrite	4 wire Coincident current	X	X	X	X	X	X	S	S	S	S	O	O	O	O	S	S	-	O				W-19 D-20 H-Based on Capacity	5	
90% without condensation	Silicon Integrated Circuits	50 Mil Core Std Ferrite	4 wire Coincident current	X	X	X	X	-	-	O	S	O	O	-	-	-	-	-	O	-	-				W-19 D-19 H-5-7/32	6	
Mil-E-5272 Proc 1 Par 4.4	Silicon Discrete	30 Mil Core (Wide Temp.) Ferrite	4 wire Coincident current	X	X	X	X	X	X	S	S	S	S	O	O	O	O	O	O	S	O				W-19 D-17 H-Based on Capacity	7	
90% without condensation	Silicon Discrete	30 Mil Core Std Ferrite	4 wire Coincident current	X	X	X	X	X	X	S	S	S	S	O	O	O	O	O	O	O	O	O	O	O	W-19 D-17 H-Based on Capacity	8	
90% without condensation	Silicon Discrete	50 Mil Core Std Ferrite	4 wire Coincident current	X	X	X	X	X	X	S	S	S	S	O	O	O	O	O	O	O	O	O	O	O	W-19 D-17 H-Based on Capacity	8	
90% without condensation	Silicon Discrete	30 Mil Core Std Ferrite	2 wire Coincident current	X	X	-	-	-	-	S	S	S	S	O	O	O	O	O	O	-	-				W-24 D-72 H-72	9	
90% without condensation	Silicon Integrated Circuits	30 Mil Std Ferrite	4-wire Coincident current	X	X	X	X	-	-	O	S	O	O	-	-	-	-	-	O	-	-				W-19 D-19 H-8¾	10	
90% without condensation	Germanium Discrete	Thin Film	Word Organized Film Sandwich	X	X	-	-	-	-	S	S	S	S	O	O	O	O	O	O	-	O				W-19 D-24 H-17½	11	

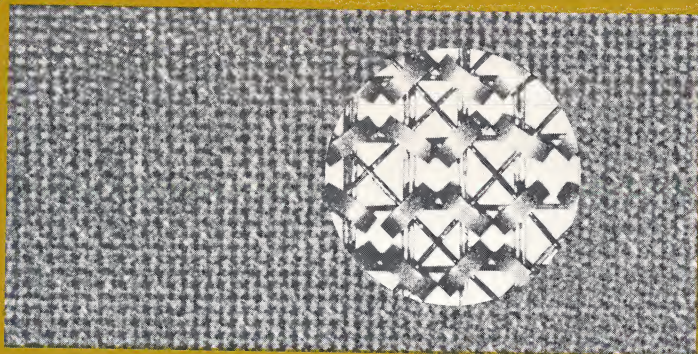
NOTES

*ACCESS MODES: 1. Random 2. Sequential 3. Random-Sequential 4. Sequential Interlace 5. Random-Sequential Interlace 6. General Purpose
 **FEATURES: AR—Address Register DR—Data Register PS—Power Supply ST—Self Test MC—Memory Clear (Standard on MB, MA, MS, MR, and ML Half cycle Units) FS—Flag Signals PC—Parity Check PG—Parity Generate MVC—Marginal Voltage Check DS—Data Saver HS—Heated Stack ML—Manual Load

***MECHANICAL LAYOUT: W—Width D—Depth H—Height

†400 CPS optional

FABRI-TEK Planes and Stacks



Select your design from more than 2,000 different coincident-current core memory planes supplied as standard by Fabri-Tek. Basic component selection includes 16 frame styles, eight core designs, four inhibit wiring patterns, and two plane interconnect methods. Most plane configurations are available with heater or ground plane.

Proprietary techniques for controlling heat provide even distribution to all the cores in a Fabri-Tek temperature controlled stack. Many stacks can be supplied with wide-temperature, lithium ferrite cores which eliminate the need for temperature compensation.

Standard planes are available with the following characteristics:

Switching speeds: 0.16 to 1.25 usec
Core capacity: 4,096, 8,192 and 16,384

Environmental:

Temperature: -10°C to 50°C

Humidity: To 90 percent without condensation

Shock: 30 G's standard commercial

Vibration: 10 G's standard commercial

Core sizes: 20-mil, 30-mil and 50-mil

Wiring configuration:

Two-, three- or four-wire standard coincident-current with either single or double winding

Memory stacks can be supplied in any configuration using the basic plane designs described above. As in all Fabri-Tek equipment, the finished stack is designed for compatibility with your system's physical and electrical interface. Should you have special stack requirements, e.g., packaging, temperature control, finish, Fabri-Tek engineers are available to assist you.

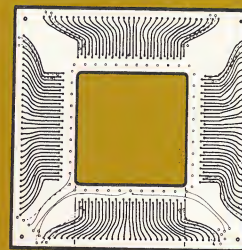
The table at the right presents a typical plane configuration in each of the standard core capacities. Complete plane and stack data are given in section 1 of the master catalog.

Typical plane configurations

Shown here are three planes (one from each of the standard Fabri-Tek series). Core properties and complete plane ELR characteristics are given, along with physical dimensions and accessory information.

SERIES F07 (4,096 cores)

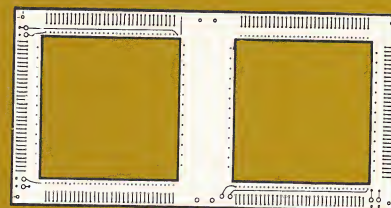
1



Example: F07D3A0102

SERIES F08 (8,192 cores)

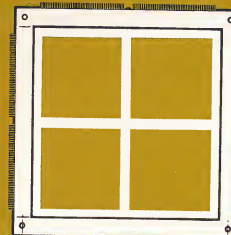
2



Example: F08G5A1110

SERIES F09 (16,384 cores)

3

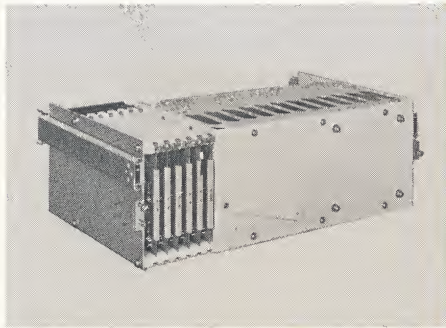


Example: F0902B0001

Core properties

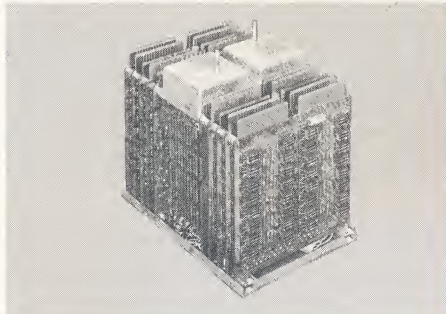
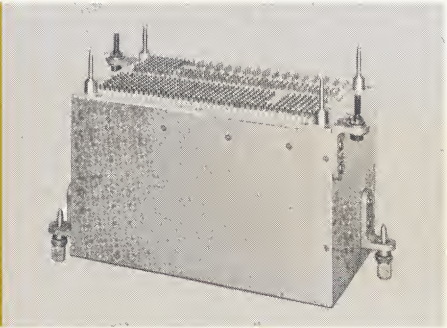
Typical electrical parameters

Full write and read drive current ($I_m = MA \pm 1\%$)	Disturb/write current ($I_d = MA \pm 1\%$)	Pulse rise time ($T_r = \text{usec} \pm 10\%$)	Pulse duration ($T_d = \text{usec} \pm 10\%$)	Undisturbed ONE response ($UV_1 = MV$)	Disturbed ZERO response ($dV_2 = MV$)	Switching time ($T_s = \text{usec}$)	Peaking time ($T_p = \text{usec}$)	EAC (Volts)			L (Microhenries)			R (Ohms)			
								X Lines	Y Lines	Inhibits	X Lines	Y Lines	Inhibits	X Lines	Y Lines	Inhibits	Sense
640	360	0.1	0.6	37 min 72 max	10 max	0.38 min 0.46 max	0.21 min 0.27 max	0.76	0.76	19.6	0.38	0.38	10.5	0.30	0.30	12.50	16.50
Description of plane Solid frame, 30-mil cores, inhibit wiring parallel to Y axis in format A, with type 0 interconnect wiring and ground plane. Dimensions: 3.960 inches by 3.960 inches								Typical 10-plane stack, with ground plane Dimensions: 3.960 x 3.960 x 1.75 inches									
530	320	0.2	2.0	55 min 75 max	14 max	0.85 min 1.05 max	0.45 min 0.55 max	0.96	0.48	12.9	0.92	0.46	13.1	0.50	0.25	11.50	17.00
Description of plane Open frame, 50-mil cores, inhibit wiring parallel to Y axis in format B, with type 1 interconnect wiring, no accessories. Dimensions: 9.300 inches by 3.425 inches								Typical six-plane stack, with no accessories Dimensions: 9.300 x 3.425 x 1 inch									
640	385	0.05	0.40	28 min 38 max	8 max	0.22 min 0.28 max	0.11 min 0.15 max	4.0	4.0	28.1	0.62	0.62	8.9	0.90	0.90	11.50	22.00
Description of plane Extended pin frame, 20-mil cores, inhibit wiring parallel to X axis in format A, with type 0 interconnect wiring, and heater. Dimensions: 4.995 inches by 4.995 inches								Typical 18-plane stack, with heater Dimensions: 4.995 x 4.995 x 2.250 inches									



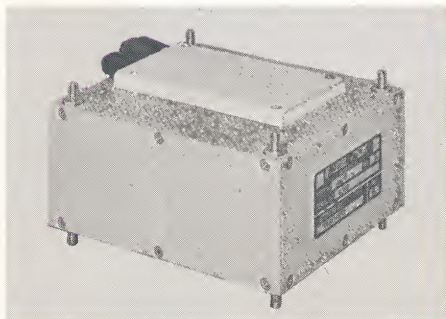
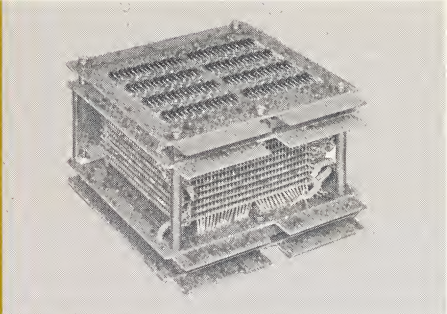
Capacity:
2,048 x 19

Capacity:
16,384 x 16



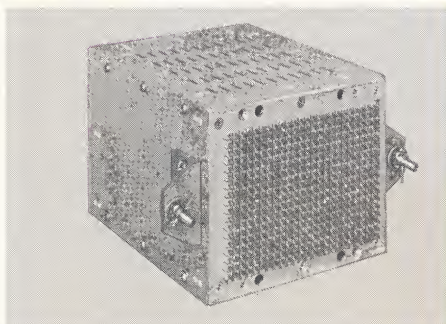
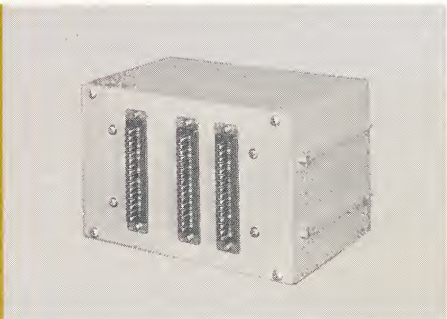
Capacity:
128 x 128 x 9

Capacity:
64 x 64 x 9



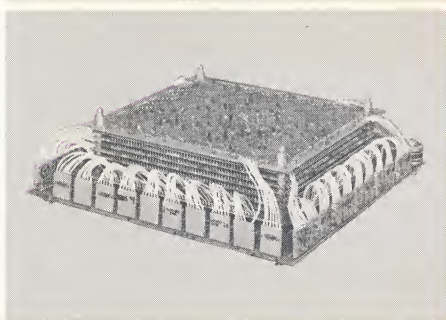
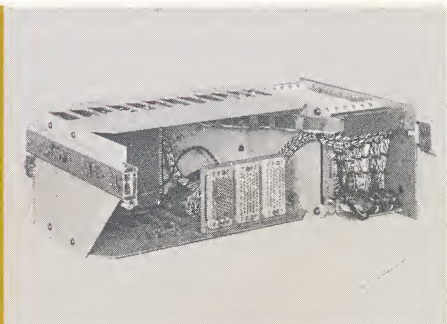
Capacity:
1,024 x 24

Capacity:
256 x 13



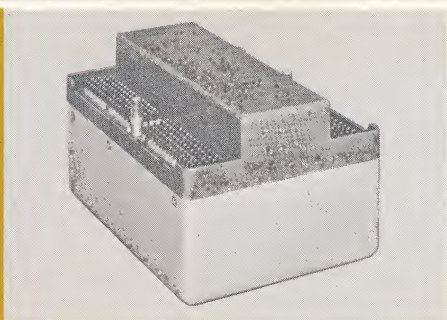
Capacity:
4,096 x 74

Capacity:
2,048 x 19



Capacity:
96 x 107 x 7

Capacity:
128 x 64 x 12
(temperature
controlled)



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nearest to you!**

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